

## SECTION 4

# ENVIRONMENTAL IMPACTS

---

---

## **4.0 ENVIRONMENTAL IMPACTS**

### **4.1 IMPACTS ON PHYSIOGRAPHY/GEOLLOGY/SOILS**

A right-of-way of 50 feet wide will be required for the Project. As shown by Figure 8, a total of nine structure locations, typically 300 to 400 feet apart, will be used for the U.S. portion of the Project. A typical structure location consists of two or three wood poles, 15.5 feet apart for small and intermediate angle turns and 17 feet apart for large angle turns. The poles will be directly installed in augured holes, averaging 10 feet deep.

The construction methods will require some disturbance of near-surface soils by construction equipment and removal of small volumes of soils from the boreholes for the wood poles. Excess excavated soil will be hauled from the site and used for fill at other locations at the Silas Ray Power Plant or other BPUB properties. There is no production of sand or gravel resources in the vicinity of the route, and no future resource exploitation is expected in this area. Therefore, no major impacts on either geologic, physiographic, or soil resources are anticipated.

### **4.2 IMPACTS ON WATER RESOURCES**

#### **4.2.1 SURFACE WATER**

No wetlands will be impacted during the placement of the structure locations. Further, it is anticipated that IBWC specifications for construction will require minimal distances allowed between the wood pole structures/guy wires to the levee toe. Such distance requirements will maintain the stability of the levee and prevent erosion into the Rio Grande River during construction. Construction techniques will include pull strings that will be “shot” from structure to structure (including the river crossing) and then used to pull tensioning cables into place. The tensioning cables will then be used to pull phase wires and static wires to the structures. Therefore, there will be no need to place men or equipment in the Rio Grande River channel to accomplish any of this work. Therefore, no impact on surface water resources is anticipated.

#### **4.2.2 GROUNDWATER**

The primary potential for impact to groundwater resources during construction activities would result from spills of petroleum products used by the equipment.

There will be no storage tanks for diesel fuel or gasoline within the construction area or inside the boundary of the IBWC jurisdictional levee. Therefore, no significant impacts to groundwater resources are anticipated.

### **4.2.3 FLOODPLAIN ASSESSMENT**

As determined by the floodplain analysis conducted by FEMA (see discussion in Section 3.1.4.1), approximately 7% of the Project lies within Zone C (areas of minimal flooding) and 93% of the Project lies within Zone A (areas within the 100-year floodplain). All of the Zone A areas of the Project are behind the IBWC levee, and therefore, all floodplain areas are within the jurisdictional boundary of the IBWC. BPUB has addressed the potential for impact within the floodplain during discussions with IBWC. As part of the IBWC licensing process, the IBWC may require the BPUB to conduct a hydraulic analysis to determine if the design flood level within the floodplain will be affected. However, given that the woodpole structures are of minimal cross-sectional area in comparison to the broad area comprising the floodplain, no impact to the floodplain from the construction or operation of the proposed transmission line is expected. A final decision to require the hydraulic analysis will be part of the evaluation to be performed by IBWC, and if required, would be a condition of any license the IBWC would issue.

## **4.3 IMPACTS ON VEGETATION AND WILDLIFE**

Only minimal impacts on vegetation and wildlife are expected to result from construction and operation of the proposed transmission line. Construction impacts will result from installation of each of the wooden “H” frame support structures. Each will require a cleared area of approximately 400 square-feet (approximately 20 feet by 20 feet). The discussion below includes comments regarding the potential for impacts on threatened and endangered (T&E) species. Concerns for threatened and endangered species are also evident in comments and recommendations provided by the USFWS and the TPWD, and are discussed below.

### **4.3.1 IMPACTS ON THREATENED AND ENDANGERED SPECIES**

The potential for impacts to threatened and endangered species have been addressed by a field botanical and biological survey (described in Section 3). The report, *“Environmental Survey for Endangered, Threatened and Candidate Species for Brownsville Public Utilities Board Proposed Electric Transmission Line from Silas Ray Power Plant to Mexico”* (see Appendix E), indicates that threatened and endangered species were not identified during the field surveys. However, to the extent that there is a potential for impact to threatened or endangered raptors or other migratory birds, these issues are discussed below.

### 4.3.2 AGENCY COMMENTS AND RECOMMENDATIONS

During consultation with the USFWS and the TPWD, these agencies provided certain suggestions or recommendations designed to minimize potential impacts to vegetation and wildlife species.

#### 4.3.2.1 USFWS

Potential issues identified by the USFWS regarding the construction of the transmission line are discussed in their letter dated May 4, 2000, included in Appendix B. The USFWS concluded: "It appears that Federally-listed species are not likely to be adversely affected by the proposed activities. Regarding wetlands and other important fish and wildlife resources, it appears that impacts to these resources will be minimal." These comments notwithstanding, the USFWS provided suggestions designed to mitigate the potential impacts of construction of the transmission line, including:

- Citing a concern for the potential for powerline collisions and/or electrocutions by birds near wetlands and other bodies of water, USFWS recommended that "these areas should be marked with appropriate visual marking devices." Consistent with USFWS comments, the proposed Project facilities will either be placed to avoid wetlands or span them. In addition, the conductors and static lines near wetlands will be marked with optic yellow balls to minimize collisions by birds. These marking devices should be approximately 9 inches in diameter on the static wire and 24 inches on the conductors. The balls should possess a black vertical stripe to increase effectiveness. The aviation balls should be situated on conductor and static wires in an alternating fashion. These aviation balls should be installed at 240-foot intervals on each conductor and 160-foot intervals on each static wire.
- The USFWS noted that birds of prey frequently use powerlines and support structures for perching and nesting, thus raising a concern for electrocution. Therefore, USFWS recommended that the transmission line should be "designed and constructed to prevent the electrocution of raptors." Since birds will perch on the proposed lines and towers, the potential for electrocution of large individuals will exist. The risk of electrocution will be reduced by incorporating the techniques described in *Suggested Practices for Raptor Protection on Powerlines – State of the Art in 1996*. The USFWS recommended that "proper design includes adequate separation of energized hardware or insulation of wires where sufficient separation cannot be attained." For raptor protection, BPUB has designed the line, such that the spacing among conductors and between any conductor and the groundwire will exceed 60 inches. In addition, consistent with USFWS recommendations, the use of grounded steel cross-arm braces will be avoided as a construction technique.

- The USFWS commented that many bird species protected under the Migratory Bird Treaty Act may nest in any area containing trees or other suitable habitat, and therefore recommended that vegetation disturbances associated with construction should be avoided during the general nesting period of March through August or areas to be disturbed should be surveyed first for nesting birds to avoid destruction of nests and eggs. Since vegetation in the Project Area could provide critical bird nesting habitat, BPUB has determined that tree trimming, footprint clearing for pole structures, and construction will be scheduled for September through February, or areas proposed for disturbance during March through August will be surveyed first for nesting birds to avoid inadvertent destruction of nests, eggs or young.

### 4.3.2.2 TPWD

Potential issues identified by the TPWD regarding the construction of the transmission line are discussed in their comments dated May 24, 2000, included in Appendix B. The TPWD provided seven specific comments that will be addressed prior to, during, or after construction:

- The TPWD noted that the state's Biological and Conservation Data System includes less than a representative inventory of rare resources in many areas of the state, and may not provide a definitive statement as to the presence or absence of rare or T&E species at the Project Area. Although minimal impacts on vegetation are expected because of the small areas involved, impacts on the small areas could be important if T&E species are present or critical habitat is disturbed. To avoid such potentially significant impacts, the specific locations of support structures have been examined by a qualified botanist familiar with local species to determine if endangered or threatened plant species are present at the structure locations prior to construction. The report "*Environmental Survey for Endangered, Threatened and Candidate Species for Brownsville Public Utilities Board Proposed Electric Transmission Line from Silas Ray Power Plant to Mexico*" (the Field Survey Report) dated November 1, 2000, prepared for BPUB by a botanist recommended by the USFWS may be found in Appendix E. The only plant species of potential concern noted by the Field Survey Report is the sabal palm (*Sabal mexicana*). The sabal palm is of potential concern for its aesthetic value, and is not a Threatened, Endangered or Candidate species. Approximately 48 sabal palms, ranging from approximately three to 28 feet in height, were randomly scattered between proposed Structure No. 2 and proposed Structure No. 5. Although mature sabal palms can grow to 50 feet high, there are currently only four sabal palms high enough within the right-of-way that require mitigation. These four sabal palms will be relocated to a public area in Brownsville. In accordance with the other recommendations contained in the Field Survey Report (Appendix E), BPUB plans to minimize future disturbance to the sabal palms within the 50-foot right-of-way by managing them individually as needed, if they grow to a height requiring individual removal, trimming or relocation.

- The TPWD provided a list of T&E species specific to Cameron County, including a description of the Texas Ebony-Anacua Series rare plant community. The specific locations of support structures were examined by a qualified botanist (see the Field Survey Report, Appendix E) familiar with local species to determine if endangered or threatened plant species are present at the structure locations prior to construction. None of the vascular plants noted in the Appendix B list provided by TPWD were encountered during the Field Survey. Further, the Field Survey Report indicates that the area under the right-of-way does not satisfy the definition of Texas Ebony-Anacua Series community.
- The TPWD recommended that USFWS guidelines be incorporated into the design for the Project, as appropriate. The BPUB has incorporated USFWS recommendations into the design of the transmission line, as described earlier in this section. General recommendations provided by TPWD for design and construction of electrical transmission lines are included in the comments provided by the TPWD in Appendix B. Many of these recommendations have been addressed above, per the recommendations made by the USFWS. Other general TPWD recommendations have been addressed as follows: Vegetation in the right-of-way will be trimmed to maintain a height of not more than 25 feet during construction and periodically during operation. The right-of-way will be 50 feet wide. Trimming will be accomplished by mechanical means; herbicides will not be used. Clearing will not be required along open road rights-of-way. Clearing of vegetation is anticipated for six structures. Vegetation at three structure locations (Structures 3, 4 and 5, as shown on Figure 8) will be removed; a total cleared area of less than 0.10 acres will result. The transmission line has been designed to cross the Rio Grand River at a right angle. Wire stringing of lines across the Rio Grande will not involve construction in the river or on the banks, thereby avoiding any interaction with the river through the use of pull strings that will be “shot” across the river and then used to pull tension cables into place between towers on either side of the river. These tension cables will then be used to pull phase wires and static wires to the structures. On the Mexico side of the crossing the transmission line structure is located on high ground out of the floodway. Therefore, the proposed transmission line and associated Rio Grande crossing will minimize any contact or impact on the river. The potential for erosion from disturbed areas around structures will be minimal compared to siltation associated with local farming. The disturbed areas around each new tower will not be seeded, per the recommendations in the Field Survey Report which indicates that native grass and plant species will soon re-establish themselves after installation of the structures.
- The TPWD recommended that footprint clearing and tree topping be conducted outside of breeding season to avoid impacting nesting species. As previously described per USFWS concerns, BPUB has determined that tree trimming, footprint clearing for pole structures, and construction will be scheduled for September through February, or areas proposed for disturbance

will be surveyed first for nesting birds to avoid inadvertent destruction of nests, eggs or young.

- Citing concern for ecotourism generated by the diversity of wildlife in the area, the TPWD suggested that the direct route of transmission line be reconsidered to follow the agricultural field, rather than the woodland habitat. As described in Section 2, the BPUB evaluated the agricultural field as an alternate transmission line route in consideration of engineering, economic, right-of-way, and environmental issues. Based upon this evaluation, the BPUB has determined that the route, as shown in Figures 1 and 2 is the preferred route.
- The TPWD recommended that unavoidable impacts, such as disturbance of native grasses or rare species, should be addressed in a manner to avoid impact to these natural resources. As described by the Field Survey Report (Appendix E), the specific locations of support structures were examined by a qualified botanist familiar with local species to identify plant species encountered along the proposed route. As previously described, threatened, endangered or candidate species were not encountered along the proposed route. Other plans for mitigation are described earlier in this section.
- The TPWD noted a particular concern for the Texas Ayenia (*Ayenia limitaris*) plant species in this particular area. The Texas Ayenia was not encountered during the Field Survey.

### 4.4 IMPACTS ON SOCIOECONOMICS

The socioeconomic impacts from the Project are not expected to be significant. With the exception of three man-days of contracted tree-trimming in the vicinity of Structures 3, 4, 5, and between Structures 8 and 9, BPUB will use their existing work force for construction of the transmission line. Other than the tree-trimming, no additional contractor labor will be required for the Project. Construction of the transmission line is expected to take a total of 120 man-days of BPUB employees working over a 60-day period of time. A portion of Project-generated expenditures will most likely enter the local economy through purchases such as fuel, food, and possibly building materials. Since BPUB owns the right-of-way property, no land will be taken off the tax rolls. As a result of the opportunity to transfer power into Mexico, BPUB could potentially generate more revenue, and spend more on operations and maintenance at the Silas Ray Power Plant.

If the BPUB did not build the transmission line, and assuming CFE was still in the market for additional electrical power, other projects could be proposed to meet this demand. These options could include the building of other transmission lines in different locations, or the construction of new power plants either in the U.S. or Mexico.

## **4.5 IMPACTS ON LAND USE, AESTHETICS, AND RECREATION**

### **4.5.1 LAND USE**

Land use impacts are determined by the amount of land, whatever its use, that is displaced by the transmission line ROW and by the compatibility of the transmission line with adjacent land uses. The route is being constructed entirely on land owned by the BPUB, within a 50-foot ROW. The current land use (access to BPUB facilities) will not be impacted by the new transmission line. Similarly, agricultural land use adjacent to the Morales Banco, approximately 500 feet south of the east-west portion of the route will not be impacted by installation of the line. Additionally, land use to the north (filtration plant holding ponds) will not be impacted by construction of the transmission line.

### **4.5.2 AESTHETICS**

The extreme easterly end of the proposed transmission route (i.e., Structure No. 10 at the substation) is approximately 700 feet west of the nearest residences at the end of Rio Vista and Border Streets. Due to existing trees and other power plant features that almost obscure the entire line of sight, Structure 10 and the remainder of the proposed line will not be visible from these nearest residences. Two homes on 13<sup>th</sup> Street, approximately 900 to 1,200 feet east of the proposed line will possibly have a view of the tops of some of the poles; however the view from these homes is heavily buffered by trees and several existing power plant features, including a nearby, 69-kV line (with 70-foot wood poles).

A railroad embankment, the water filtration plant, an existing 69-kV line (with 70-foot wood poles), and existing trees will obscure the visibility of all but the top of the poles of the proposed transmission line for residential areas located approximately 1,500 to 2,500 feet east and northeast of the proposed alignment. In other areas approximately 1,100 to 2,000 feet to the south and southeast, a view of all but possibly the very top of the poles will be blocked or obscured by the IBWC levee, existing trees, an existing 1.8 million-gallon fuel tank, or other features the Silas Ray Power Plant such as an already existing 69-kV line (with 70-foot tall wood poles). These facts, coupled with the buffering provided by the existing power plant, trees, the water filtration plant, existing floodplain levee, an existing 69-kV transmission line, and the railroad in the Project Area indicate little if any aesthetic impact to nearby residential areas.

### **4.5.3 RECREATION**

The Project will not affect any recreation areas.



### **4.5.4 TRANSPORTATION/AVIATION**

The Project will not adversely affect any roads or highways in the Project Area. Delivery of materials (poles, conductor and hardware) may result in a very temporary disruption of traffic along road corridors that access the Silas Ray Power Plant. This will be limited to a few hours at most.

The Project is a significant distance (approximately six miles) from the local Brownsville Airport and presents no hazard to aircraft using the airport. Aviation line markers (balls) will be installed on the line at regular intervals.

### **4.6 IMPACTS ON CULTURAL RESOURCES**

The Texas Historical Commission has determined the Project will have no effect on National Register-eligible/listed properties or State Archeological Landmarks (see Appendix B).

### **4.7 AIR QUALITY, NOISE, AND ELECTRIC AND MAGNETIC FIELDS**

#### **4.7.1 AIR QUALITY**

As previously stated, the Project will carry power generated by the natural gas fired Silas Ray Power Plant into Mexico via the proposed 138-kV transmission line. The Silas Ray Power Plant consists of two grandfathered and two permitted units that operate year-round with total annual constraints on emissions. The electrical output of the units (and, consequently, the air emissions) will be the same whether power is being transmitted to Mexico or to the Texas system. BPUB has not and will not obtain any modifications to the existing permits related to emissions from the Silas Ray Power Plant in order to supply power to Mexico. Therefore, the proposed transmission line will not increase the existing permitted emissions and/or operating hours for the Silas Ray Power Plant.

The only effect of the proposed Project on air quality would occur during construction. Fugitive dust and construction vehicle emissions may result from operation of the construction equipment. These impacts are expected to be minimal and would not affect the public since the Project location is a significant distance from residential and commercial areas.

No significant impacts to either climate or air quality are anticipated to result from the operation and maintenance of the proposed transmission line.

#### **4.7.2 NOISE**

Noise is commonly defined as unwanted or objectionable sound. It emanates from mobile sources, such as vehicular traffic, or from stationary sources, such as industrial facilities. The combination of background noise from various sources

in a given area is referred to as the "ambient noise level." The ambient noise level is related directly to the pattern of land use. Major noise sources within the Project Area include the Silas Ray Power Plant, BPUB Water Filtration Plant and vehicle traffic in the area.

It is typically recommended that noise equivalent levels in residential areas should not exceed 60 dBA in the daytime or 50 dBA at night. Recommended maximum levels in commercial and industrial areas are 5 to 10 dBA higher.

The largest increase in noise levels resulting from the proposed Project would occur during construction. At a distance of 50 feet, construction noise may at times exceed 80 (dB) because of augers and similar construction equipment. By comparison, a busy street has a typical noise level of about 80 (dB). All of the construction work will be performed during the daytime, between 8 A.M. to 5 P.M., and therefore will not result in nighttime impact to nearby residents. Therefore, since the Project location is approximately 700 feet from the nearest residential areas, and since noise impacts associated with the daytime construction activities are short term in nature, no significant impact is anticipated.

During operation, noise may emanate from transmission lines as a result of the corona effect. Corona is the breakdown of air very near conductors and occurs when the electric field is locally intensified by irregularities on the conductor surface such as scratches or water drops. Corona, as an issue for transmission lines, is more significant for extra-high voltage lines of 345-kV or above but will occur on lower voltage lines during rain or fog conditions. The physical manifestations of corona include a crackling or hissing noise and very small amounts of light. Besides the nuisance aspects of corona, it results in undesirable power loss over a transmission line. Therefore, the design of transmission lines incorporates conductor and equipment, which limit or eliminate corona. For a transmission line at 138-kV the field gradient at the conductor surface is anticipated to be below the threshold for generating corona during most operating conditions, although there may be some periodic minor corona and audible noise during rain and fog conditions. Any low level hissing or crackling would only be noticeable in close proximity to the line and is not considered significant. There are no standards or regulations pertaining to corona levels on electric power facilities.

#### **4.7.3 RADIO/TELEVISION INTERFERENCE**

Electrical effects of transmission lines can be characterized as "corona effects" and "field effects." Effects of corona include audible noise, visible light, radio and television interference, and production of ozone. Field effects are induced currents and voltages, and related effects resulting from interaction between electric and magnetic fields.

Interference with radio and television signals from transmission lines is generally due to corona losses from the conductors or noise associated with faulty

insulators or hardware and is a very site-specific phenomenon. As discussed above in the Noise section, corona effects for 138-kV transmission lines are extremely small and, therefore, no problems with radio noise emanating from conductors are anticipated.

If radio or television interference results from the operation of the proposed line, the source of the signal can be identified and corrected by replacing equipment, tightening hardware connections, or shunting the signal to ground through a filter, thereby restoring reception to pre-existing levels.

Very small amounts of ozone can be produced as a result of corona effects on transmission lines. Typically corona effects occur during wet-rainy conditions where faulty insulators or loose hardware exist on a transmission line. For a 138-kV transmission line ozone production due to corona would be extremely small and unmeasurable at the edge of the ROW.

### **4.7.4 ELECTRIC AND MAGNETIC FIELDS**

#### **4.7.4.1 BACKGROUND DISCUSSION**

The transmission of alternating current (ac) electricity produces electric and magnetic fields. These fields have the same frequency as the electricity which creates them. Thus, the fields that would be associated with the subject Project are 60 Hz fields.

Electric fields are produced by electrical charges (voltage) on a power line. Electric field strength is directly related to the voltage difference between conductors and the ground and nearby objects. The strength of electric fields is measured in units of volts per meter (v/m) or kilovolts per meter (kV/m).

Magnetic fields are produced by electric current flowing through conductors, or in the case of the proposed Project, the wires of the transmission line. Magnetic fields are expressed in units of milligauss (mG).

Electric and magnetic fields occur in the natural environment. The earth itself has a static or steady state magnetic field that varies, depending on location, but is generally in the range of 500 mG. The earth also produces a natural electric field of approximately 0.1 kV/m between the ground and the upper atmosphere. This natural electric field can increase to 5 kV/m during thunderstorm activity (EPRI, 1989).

Nearly all the electricity used in this county is alternating current that produces electric and magnetic fields. This includes household appliances, electric tools, electric wiring, televisions and computers. Typical magnetic fields for appliances range from 700 mG (highest value) for hair dryer at a distance of six inches to 7 mG (median value) for a color TV at a distance of one foot (EPA, 1992). Typical electric fields for households range from 250 v/m for an electric blanket to 2 v/m for an incandescent light bulb (WHO, 1984).

#### 4.7.4.2 PUBLIC HEALTH AND EMF STUDIES

For more than 20 years, questions have been asked regarding the potential effects within the electromagnetic field (EMF) environment of power lines. Over the last 10-15 years, a significant amount of research and study has been conducted to determine if there are any adverse health effects associated with EMF; however, much of the research regarding EMF and public health risks remains contradictory or inconclusive.

Generally, research related to EMF can be grouped into three categories: cellular level studies, animal/human experiments, and epidemiological studies. The studies results have been mixed, with some studies illustrating an apparent relationship between EMF and health, while other similar studies do not.

Scientists have found that EMF can produce a number of biological effects, which range from slowed heart rates to changes in the rate at which the body produces various compounds. Apparently, some of these effects are related to the electric field, while others are thought to result from the magnetic field. Often, these effects are only detectable at field strengths well in excess of those to which the public is exposed from power lines. Although it has been found that EMF causes biological effects, there is no scientific basis to conclude that the field levels associated with power lines result in any biological effects that are having negative implications for public health.

Evaluations of existing reports that have studied the question of EMF exposure and potential adverse health effects have been conducted by panels of expert scientists. Their review has provided guidance for governmental agencies or professional standard-setting groups. These scientific panels have assessed the suitability of authors' conclusions, based on an evaluation of factual information presented, as well as the methods of experimental design, data collection, and data analysis used in the studies. Consequently, the identified strengths and weaknesses of individual studies can be evaluated collectively to determine patterns or trends in the data that would lead to any conclusions of possible or probable hazards to human health resulting from EMF exposure. Such assessments have been prepared by international agencies such as the World Health Organization (WHO, 1984 and 1987) and the International Non-Ionizing Radiation Committee of the International Radiation Protection Association (IRPA/INIRC, 1990), as well as governmental agencies of a number of countries (including the U.S. EPA). In May 1999, the National Institute of Environmental Health Sciences (NIEHS) submitted to Congress its report, *"Health Effects from Exposure to Power-Line Frequency and Magnetic Fields"*, which contained mixed conclusions regarding EMF and health effects. All of these panels have concluded that the body of data, as large as it is, does not provide evidence to conclude that EMF exposure associated with electric transmission lines causes cancer or otherwise constitutes a health hazard.

### 4.7.4.3 PROPOSED PROJECT

There are no federal or Texas standards or regulations applicable to electric and/or magnetic fields. The estimated magnetic field for the proposed double circuit 138-kV transmission line at the edge of the 50-foot ROW is at 71 mG at peak usage. The estimated electric field for the proposed double circuit 138-kV transmission line at the edge of the 50-foot ROW is 1.14 kV/m at peak usage. These levels are generally consistent with transmission lines with similar voltage, ROW width and conductor configuration.

To minimize the magnetic field for the proposed Project, the individual three-phase conductors will be oriented to mutually cancel a portion of the magnetic field levels (one circuit will have a CBA orientation, while the other circuit will have a ABC orientation).

Based on the above facts, the body of scientific study, the relative levels of EMF and the remote location of the proposed transmission line, no adverse impacts from EMF are anticipated.